

S-PA Pre-Algebra Session 14 7/20

36, 48

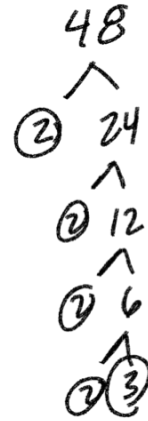
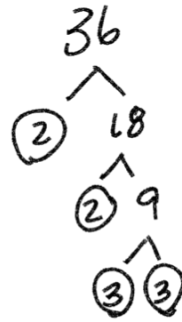
1.) Prime Factorize ✓

2.) GCF

3.) LCM

4.) Reduce  $\frac{36}{48}$

1.)



36: 3 · 3 · 2 · 2

48: 3 · 2 · 2 · 2 · 2

2.) GCF  
 36: 3 · 3 · 2 · 2  
 48: 3 · 2 · 2 · 2 · 2

take pairs  
 multiply one of each

GCF: 3 · 2 · 2 = 12

3.) LCM  
~~36: 3 · 3 · 2 · 2~~  
~~48: 3 · 2 · 2 · 2 · 2~~

take pairs  
 Thans - delete one  
 of each

LCM: 3 \* 48 = 144

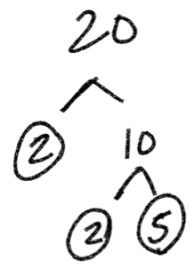
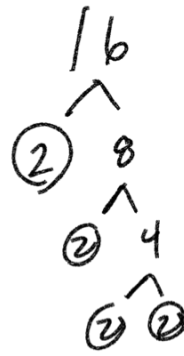
4.) Reduce

$\frac{36}{48} = \frac{\cancel{3} \cdot \cancel{3} \cdot \cancel{2} \cdot \cancel{2}}{\cancel{3} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot 2}$

$\frac{3}{4}$

take pairs  
 Kill them all -  
 multiply survivors

$$20x^5y^3, 16x^3y^8$$



1.) Factorize coefficients

2.) GCF

3.) Reduce  $\frac{16x^3y^8}{20x^5y^3}$

$$16 : 2 \cdot 2 \cdot 2 \cdot 2$$

$$20 : 5 \cdot 2 \cdot 2$$

2.) GCF  $\frac{16x^3y^8}{20x^5y^3}$

$$\frac{2 \cdot 2 \cdot 2 \cdot 2 \cdot x^3 \cdot y^8}{5 \cdot 2 \cdot 2 \cdot x^5 \cdot y^3}$$

Look for the smallest exponent on each variable

$$\text{GCF} : 2 \cdot 2 \cdot x^3 y^3 = \boxed{4x^3y^3}$$

3. Reduce

$$\frac{16x^3y^8}{20x^5y^3} = \frac{\cancel{2} \cdot \cancel{2} \cdot 2 \cdot 2 \cdot x^3 \cdot y^8}{5 \cdot \cancel{2} \cdot \cancel{2} \cdot x^5 \cdot y^3} = \boxed{\frac{4y^5}{5x^2}}$$

$$\frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = \frac{x^3}{x^5} = x^{3-5} = x^{-2} = \frac{1}{x^2}$$

$$\frac{y^{\boxed{8}}}{y^3} = y^{8-3} = y^5$$

$$\boxed{8a^3b^4c^5} * \boxed{4a^7b^1c^4} = \boxed{32a^{10}b^5c^9}$$

$$8 * 4 = 32$$

$$a^3 * a^7 = a^{3+7} = a^{10}$$

$$b^4 * b^1 = b^{4+1} = b^5$$

$$c^5 * c^4 = c^{5+4} = c^9$$

Multiply exponents,  
with the same base,  
you add them.

Reduce

$$\frac{18a^3b^7c}{3a^1b^4c^3} = \frac{6a^2b^3}{c^2}$$

$$\frac{18}{3} = 6$$

$$\frac{a^3}{a^1} = a^{3-1} = a^2$$

$$\frac{b^7}{b^4} = b^{7-4} = b^3$$

$$\frac{c^1}{c^3} = c^{1-3} = c^{-2} = \frac{1}{c^2}$$

Divide exponent,  
with the same base,  
you subtract them.

$$\frac{2a^3b^4 * 6a^4b^8c}{3ab^5c^3} = \frac{12a^{3+4}b^{4+8}c}{3ab^5c^3}$$

$$\frac{12a^7b^{12}c}{3ab^5c^3} = \boxed{\frac{4a^6b^7}{c^2}}$$

$$\frac{a^7}{a} = a^{7-1} = a^6 \quad \frac{b^{12}}{b^5} = b^{12-5} = b^7$$

$$\frac{c}{c^3} = c^{1-3} = c^{-2} = \frac{1}{c^2}$$

$$3^0 = 1 \quad -2^0 = 1 \quad x^0 = 1 \quad \left(\frac{1}{x}\right)^0 = 1$$

$$6^{-2} = \frac{1}{6^2} = \frac{1}{36} \quad a^{-4} = \frac{1}{a^4}$$

$$(2^1a^3b^5)^3 = 2^{1*3} a^{3*3} b^{5*3} = 2^3 a^9 b^{15} = \boxed{8a^9b^{15}}$$

$$(4a^7b^3)^2 = 4^2 a^{7*2} b^{3*2}$$

$$4^2 a^9 b^5 = \boxed{16a^9b^5}$$

$$(4a * 8a^3)^2$$

$$(32a^4)^2$$

$$\frac{4a^2}{b^3} = \frac{4(5)^2}{(2)^3} = \frac{4(25)}{8 \div 4} = \frac{1(25)}{2} = \boxed{\frac{25}{2}}$$

↓ ↓  
PEMDAS...  
order of operations

$$4x^2y^3$$

$$x=1 \quad y=2$$

$$1^2 = 1 \cdot 1 = 1$$

$$2^3 = 2 \cdot 2 \cdot 2$$

$$4(1)^2(2)^3 = 4 \cdot 1 \cdot 8 = \boxed{32}$$

$$8^3 = 8 \cdot 8 \cdot 8 = 512$$

$$\frac{8a^2b^3}{c}$$

$$a=4 \quad b=2 \quad c=32$$

$$\frac{8(4)^2(2)^3}{32}$$

$$= \frac{8 \cdot 16 \cdot 8}{32 \div 16} = \frac{8 \cdot 1 \cdot 8}{2 \div 2} = \frac{4 \cdot 1 \cdot 8}{1}$$

$$\boxed{32}$$

# Scientific Notation

$$8400000. = 8.4 \times 10^6$$

Diagram: A vertical line is drawn after the 8. The digits 4, 0, 0, 0, 0, 0 are underlined with red wavy lines. Below these underlines are the numbers 6, 5, 4, 3, 2, 1 from left to right. A red arrow points from the decimal point to the 6. The result  $8.4 \times 10^6$  is enclosed in a black box.

$$3050000. = 3.05 \times 10^6$$

Diagram: A vertical line is drawn after the 3. The digits 0, 5, 0, 0, 0, 0 are underlined with blue wavy lines. A blue arrow points from the decimal point to the 6.

$$281000000000. = 2.81 \times 10^{10}$$

Diagram: A vertical line is drawn after the 2. The digits 8, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0 are underlined with red wavy lines. A red arrow points from the decimal point to the 10. The number 10 is enclosed in a red box.

$$7048. = 7.048 \times 10^3$$

Diagram: A vertical line is drawn after the 7. The digits 0, 4, 8 are underlined with red wavy lines. A red arrow points from the decimal point to the 3. Below the underlines is the number 3. A red arrow points from the 3 to the 4 in the equation  $3 + 1 = 4$ .

$$0.000893 = 8.93 \times 10^{-4}$$

Diagram: A vertical line is drawn after the 8. The digits 0, 0, 0, 8, 9, 3 are underlined with blue wavy lines. A blue arrow points from the decimal point to the 4. A red arrow points from the 4 to the -4 in the equation.

$$0.000003781 = 3.781 \times 10^{-6}$$

Diagram: A vertical line is drawn after the 3. The digits 0, 0, 0, 0, 0, 3, 7, 8, 1 are underlined with red wavy lines. A red arrow points from the decimal point to the 6. Below the underlines is the number 6. The text "leading zeros" is written in red. Below that, the equation  $5 + 1 = 6$  is written, with the 6 circled in red. A red arrow points from the circled 6 to the -6 in the equation.

$$0.\overbrace{00004}^{\boxed{0.0000450}} = 4.5 \times 10^{-5}$$

1 2 3 4 5      4+1=5

$$1.43 \times 10^8 = 143000000$$

⊕ →

$$2.8911 \times 10^{-3} = 0.0028911$$

← ⊖

$$(2 \times 10^4)(6 \times 10^3) = 12 \times 10^{4+3} = 12 \times 10^7$$

$$12 \times 10^7 \xrightarrow{7+1} \boxed{1.2 \times 10^8}$$

But... scientific notation has only one digit before the decimal

